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THE INFLUENCE OF ADDING RAISINS FLOUR WITH OR WITHOUT PROBIOTIC FOR REDUCING HEAT STRESS IMPACTS IN IRAQI AWASSI LAMBS

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Abstract

The objective of this study was to evaluate the effects of raisins flour with or without Saccharomyces cerevisiae in heat stressed sheep. Three groups of 5 Awassi males 2-3 month old lambs each. Weighting 23.86 ± 0.19 kg were fed control diet supplemented 10% raisins flour with or without 5g Saccharomyces cerevisiae as Baker's yeast daily for 216 days. Controls were fed 3% concentrate with wheat straw. Blood collected during summer and winter for blood pH and serum cortisol level determination. Results show that raisins flour supplement with or without *Saccharomyces cerevisiae* (Sc) increased blood pH during summer. And there is no significant effect between groups during winter. While the cortisol level showed decrease in the treatment group compared with control group during summer, while the G3 group significant decrease compared with control group during winter.

Keywords **:** Raisins flour, probiotic, heat stress, Awassi lambs.

Introduction

Iraq climate is very hot and dry all over the year (Zaini, 2013; Al-Waeli *et al*., 2017). Sheep thermo neutralzone ranged between −12 and 32°, and that depending also on their physiological and health state, and type of feeding (Finocchiaro *et al*. 2005, Gaughan *et al*., 2009). Temperature elevation led to disturbance in hormones and blood metabolites decrease of feed intake, and disturbance in nutrients metabolism (Marai *et al*., 2003, 2004).Cortisol elevating is an indicator for several types of stress (Wojtas *et al*., 2013), and that elevator has been associated with decrease in total antioxidant levels and low total antioxidant capacity which is a common feature in all conditions (Wang *et al*., 2007) Heat stress decreases the ability of red blood cells for exchanging oxygen and nutrients, also decrease the eliminate of carbon dioxide and redistribution in blood flow (Eltawill & Narendran, 1990), that will decrease blood pH (Wojtas *et al*., 2013). Heat stress increases lipid peroxidation and enhance the formation of reactive oxygen species (ROS) (Altan *et al*., 2003). Grapes have been shown to be good sources of phenolic antioxidants (Teissedre *et al*., 1996; Pastrana-Bonilla *et al*., 2003; Mahdi, 2020)

Materials and Methods

This experiment was performed of at The Faculty of Agriculture of the University of Kufa, Iraq from 1/7/2018 to 1/2/2019 (Summer-winter). three groups of 5 Awassi male 2-3 month old lambs each, weighting 23.86 ± 0.19 kg were fed control diet supplemented 10% raisins flour with or without 5g *Saccharomyces cerevisiae* as Baker's yeast daily for 216 days. Controls were fed 3% concentrate with wheat straw. Jugular blood (10ml) was drawn by sterile disposable syringes at 03:00 pm of summer and winter, then separated by centrifuge at 3000 rpm for 15 minutes for serum cortisol, which is measured with an enzyme-linked immunosorbent assay (ELISA) with Cortisol Assay Kit (Hamburg GmbH, Gemany), and the blood cellular part lasted after serum extract used for measuring blood pH with HANA Digital pH Meter, Data was analyzed by one-way ANOVA, and Duncan multiple range test were used to determine the significance among means (SAS) (13)

Results and Discussion

Results are shown In Tables 1-4. Compared with controls, our results suggest that raisins flour supplement with or without *Saccharomyces cerevisiae* (Sc) boosted blood pH during summer (table 1).While during winter there is non-significant effect between groups (Table 2). Erisir *et al*. (2016) found that heat stress increases reactive oxygen species, it leads to oxidative stress. The dietary grape increased antioxidants in the diet, which stimulates the antioxidant response in the sheep in heat stress and reduced oxidative stress (Alba *et al*., 2019). Heat stress has significant effects on rumen pH due to reduced salivary bicarbonate buffering (Shearer, 2005). That led to decreased blood pH, duo to overproduction of ruminal D-lactate (Hernández *et al*., 2014). Mahdi, (2020) show that grape pomace powder increase rumen pH, duo to the high ratio of fiber in grape pomace which is increasing rumination and salivary secretion, also found that feeding grown lambs with dried red grape pomace with *Saccharomyces cerevisiae* increase rumen pH significantly comparing with control. *Saccharomyces cerevisiae* supplementation decrease lactate concentration in the rumen by stimulating bacteria that ferment lactate (Rossi *et al.*, 2006).

Results from table 3 showed a significant decrease in cortisol level in the treatment group compared with control group during summer, while the G3 group significant decrease compared with control group during winter (table 4).Stress stimulates the activity of the hypothalamic–pituitary– adrenal axis and a marked increase in serum cortisol levels (Komesaroff *et al*., 1998). Measuring cortisol is a good indicator for environmental stresses, and Plasma cortisol concentrations tend to be the standard to which other measures of stress are compared (Miller *et al*., 1991). Grapes are biologically active dietary components with high antioxidant activities such as Ascorbic acid (Derradji-Benmeziane *et al*., 2014). Ascorbic acid speeds the decrease

of the levels of circulating cortisol in the body post stress (Brody *et al*., 2002). *Saccharomyces cerevisiae* also have several potential mechanisms that decrease stress, by containing substances which reduce stress, or acting as an antioxidant, and scavenging free radicals, also make the rumen ecosystem ideal through decrease lactate and improve the feed efficiency of heat-stressed animals (Schingoethe *et al*., 2004).

Table 1 : Mean + SE pH in lambs supplemented 10% raisins flour (RF) with or without 5g or *Saccharomyces cerevisiae* (SC) during summer.

Treatments	Season	PH +S.E
Control(G1)	Summer	6.95± 0.01 c
10% RP (G2)		7.01± 0.02 b
10% RP 5g SC(G3)		7.15± 0.02 a
Significance		**

*(P< 0.01)

Table 2 : Mean + SE pH in lambs supplemented 10% raisins flour (RF) with or without 5g *Saccharomyces cerevisiae* (SC) during winter.

Treatments	Season	PH +S.E
Control(G1)	Winter	7.41± 0.8 a
10% RP (G2)		7.37± 0.9 a
10% RP 5g SC (G3)		7.30± 0.9 a
Significance		N.S

N.S: Non significant

Table 3 : Mean + SE cortisol in lambs supplemented 10% raisins flour (RF) with or without 5g *Saccharomyces cerevisiae* (SC) during summer.

Treatments	Season	cortisol +S.E
Control(G1)	Summer	9.25± 0.55 a
10% RP (G2)		7.25± 0.40 b
10% RP 5g SC (G3)		7.05± 0.36 b
Significance		**

**(P< 0.01)

Table 4 : Mean + SE cortisol in lambs supplemented 10% raisins flour (RF) with or without 5g *Saccharomyces cerevisiae* (SC) during winter.

Treatments	Season	cortisol +S.E
Control (G1)	Winter	6.86± 0.22 a
10% RP (G2)		6.77± 0.19 ab
10% RP 5g SC (G3)		6.46± 0.14 b
Significance		*

*(P< 0.05)

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